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I. VERTICAL REGENERATORS

The ordinary vertical regenerator is so constructed that it should work in a rational manner; that is, the high-temperature gases descend regularly and subdivide among the vertical passes according to their temperature, while the air and gas which is being heated subdivides into the ascending passes in the same manner. This is why the idea of Schenwelder, of dividing each of the checker chambers into two compartments, in order to secure uniform working, is fundamentally wrong. He introduced into regenerator construction a superfluous complication, and for this reason his design has been abandoned.

Nevertheless, it should not be concluded from the above that any sort of a vertical regenerator will always work in a regular manner. Vertical regenerators have an inherent tendency to work uniformly, but poor design may cause them to work in a very irregular fashion.

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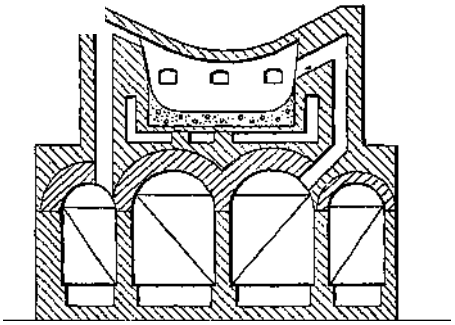

FIG. 50

For example, Fig. 50 shows a very common form regenerator, in which the current of gas from the vertical flues leading to the ports is jetted upon the top of the checkerwork. It is very evident that in this case it will be impossible to secure uniform operation. The checkerwork can only work in a uniform manner when sufficient space is provided below the arch over the chamber for the velocity of the gases to become zero or very close to zero. The eddies, which are formed under too low an arch, disturb the gas distribution and prevent the furnace from working uniformly. In order to secure uniform results it is necessary to provide sufficient space to absorb these eddy currents, in order that the gases may enter the checkerwork with a very low velocity below the arch over the chamber. As an example of a very good type of regenerator we have shown the chamber of a 40-ton open-hearth furnace at tho, plant of the Pennsylvania Steel Co., Fig. 51.